Book Reviews

Genera Palmarum. A classification of palms based on the work of Harold E. Moore, Jr.

Natalie W. Uhl and J. Dransfield

The L.H. Bailey Hortorum and The International Palm Society, Lawrence, Kansas, 1987
xxi + 610 pp., 224 plates of half-tone line drawings, 52 maps, 30 compound photographic plates in colour and 51 in monochrome, 3 watercolour plates
Price: U.S. $75 (cloth binding), $155 (full leather), including surface postage
Available from Genera Palmarum, P.O. Box 368, Lawrence, Kansas 66044, U.S.A.
ISBN 0–935868–30–5

The idea of this work, so the preface tells us, started with L.H. Bailey, founder of the L.H. Bailey Hortorum at Cornell University, who spent more than 30 years working on palms. Interviewed in 1951 at the age of 93, Bailey described his project as follows: 'I plan to define what is a palm. I plan to talk about their distribution over the face of the earth . . ., so that if a man or a woman has a specimen, that plant may be determined. And then I expect to make a classification of all the genera and to describe every genus.'. Bailey's death in 1954 left this dream unfulfilled, but fortunately he had had the foresight to make provision for a successor in the person of Harold E. Moore, Jun., whom he had appointed in 1948 and got interested in palms. Moore accepted the formidable challenge with typical American zest, not only studying all herbarium material he could lay his hands on but also undertaking extensive fieldwork so that by 1980 he had seen and collected all but 18 of the 200 genera in nature. In time Moore's name became a household word amongst all interested in palms, not the least of whom were the world-wide membership of the International Palm Society with which he was deeply involved since its inception in 1956. Moore's untimely death in 1980 left the task unfinished but in an advanced state. Once again fate intervened, and it is fortunate indeed that Associate Professor Natalie W. Uhl of Cornell University and Dr John Dransfield of Kew were qualified and willing to finish the work for publication.

This book is absolutely packed with information. Basically it consists of two parts. The first part, entitled 'The basis for the classification of palms', consists of seven comprehensive review chapters designed to provide a background for the actual classification. These well-illustrated chapters deal with morphology, anatomy including development and cytology, ecology, the fossil record, geography, evolution and relationships, and the development of palm taxonomy. Each of these makes absorbing reading. It is outside the scope of a single volume to deal exhaustively with all these aspects in the limited space available, yet each chapter is well rounded off with numerous key literature references, and provides a sound basis for anyone wishing to delve deeper. Strangely a geographical listing of the genera appears near the end of the book rather than in the chapter on geography.

The second and main part of the book comprises three quarters of the pages and constitutes the classification of the family Arecaceae (the authors actually prefer the family name Palmae and cite it as the accepted name, followed by the conserved alternative name Arecaceae). An extended family description is followed by an outline classification of the family into subfamilies, tribes and genera and stretches over four pages. There are numerous keys to the subfamilies, tribes, subtribes and genera, and whenever a large number of genera is involved, there is also a brief but useful multi-access key to genera. For each subfamily, tribe and subtribe the original literature reference, type, a description and a shaded distribution map is provided, as well as a discussion in which its delimitation and relationships are explained.

There are exactly 200 genera and each is treated in considerable detail. Again the original publication and type are cited, but also a full synonymy. The descriptions are comprehensive and are followed by brief headed paragraphs on distribution and estimated number of species, literature references to anatomical studies, ecology, fossil records, common names and uses, notes, references to taxonomic accounts, and references to illustrations in this book. For each genus there is a detailed plate of shaded line drawings to illustrate flowers and fruits. These plates, as well as text figures in the introductory chapters and glossary, and three stunningly beautiful watercolour plates of fronds, fruits and habits, were executed by Marion Ruff Sheehan, and are of very high quality indeed. My only regret is that the distribution maps are only to subtribal level, but I presume that practical considerations prevented the inclusion of a map for each genus. The photographic plates are absorbingly interesting. While some illustrate habits, most are intended to show details of flowers and fruits on which the classification rests. Most photographs are of good quality but in judging them it should be borne in mind that it is by no means easy to photograph a palm effectively in a forest environment.

The generic account is followed by a comprehensive glossary illustrated with line drawings, a bibliography of cited literature, an index of scientific names, and a subject index. A particularly useful feature is the use of the endpapers for a 'finding list of generic names', providing page references to correct names and synonyms — this alleviates the need to page through the comprehensive index. For the benefit of readers wishing to cover their books with protective material, this finding list also appears just after the table of contents.

The reader may be surprised to learn that there are an estimated 2 700 species of palms known today. Even more surprising is the immense morphological variation in respect of habit, inflorescence, fruits and pollen grains. Yet all these forms are variations on the same basic type, which forms the basis of this book. Another surprising fact is the large number of monotypic genera, namely 64 out of 200. This does not mean that there are not large genera as well, the largest being *Calamus* (370 species), *Bactris* (239), *Pinanga* (120), *Daemonorops* (115), *Licuala* (108) and *Chamaedorea* (100). These large genera consist predominantly or exclusively of forest plants, mostly as undergrowth but lianas in *Daemonorops* and *Calamus* and a large variety of growth forms in *Bactris*. Neither are the monotypic genera necessarily restricted in distribution or numbers of individuals: genera like *Nypa* and *Cocos* are enormously widespread and common, though man certainly helped *Cocos* along the way. Some palms have been well known for a long time and have had incalculable economic implications for longer than our records go back, such as *Phoenix dactylifera, Cocos nucifera* and *Borassus flabellifer*; while others came to light only in recent times such as *Wodyetia bifurcata* which was only described in 1983 but already promises to become one of the most

spectacular and desirable ornamental palms.

This book was obviously written for the professional plant taxonomist, though as is so often the case, there are today a mere handful of palm specialists in the world. It does however also demonstrate an important lesson: it *is* possible to present such information in a way which will ensure a wider readership. Thanks largely to the interest shown by scientists such as Moore, Uhl and Dransfield in living palms and their introduction into ornamental horticulture, there are today thousands of enthusiastic people all over the world beautifying the landscape with recently introduced palms species, and in their never-ending quest for knowledge they are sure to find this book a mine of indispensable, easily understandable information. The publication of this work was indeed to a large extent made possible by the generosity and enthusiasm of these amateur collectors.

Due to the wide field covered and the physical magnitude of the task, one would expect omissions and errors in such a book, yet the proof-reading appears to have been of an exceptionally high quality. The distribution map of the Hyphaeninae on p. 226 errs in not showing the presence of *Hyphaene* in northern South West Africa and Botswana, and the same is true for the map of the Phoeniceae on p. 215 even though plate 38D shows *Phoenix reclinata* growing at the Victoria Falls, outside the tribe's distribution area as shown on the map. The map of the Butiinae on p. 485 is misleading as it does not show the presence of *Cocos* on either the east or west African coast where it became naturalized as over most of its present range, and neither does it indicate the enigmatic *Jubaeopsis* on the Transkeian coast.

The book is well printed on a thin but strong semi-glossy paper which shows up the typeface and illustrations to excellent advantage. Surprisingly this 630-page book takes up only 35 mm of shelf space. It is very sturdily bound in a cloth-like material, and there is also a limited leather-bound edition.

Seldom before have I had so much pleasure out of a new book and I unhesitatingly recommend it as an essential work of reference for not only scientific institutions, but for anyone interested in these fascinating plants.

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Photomorphogenesis in Plants

Edited by R.E. Kendrick and G.H.M. Kronenberg

Martinus Nijhoff Publishers, Dordrecht, The Netherlands
XXV + 580 pp.
ISBN 90–247–33177–0 (paperback)
ISBN 90–247–3316–2 (hardback)

The effect of light on the growth of plants has received considerable attention over the last few years. There nevertheless remained room for an advanced textbook to bring together the many physiological processes which are controlled or influenced by light. This was no simple task. I do, however, believe that the editors have succeeded in this by obtaining the co-operation of most of the recognized authorities in this field of physiology. They contributed specific chapters which in themselves not only cover the most pertinent literature but also provide many useful guidelines for young researchers entering this fascinating topic.

The book is divided into 6 parts. The first is a very searching introduction. Part 2 deals with phytochrome. Attention is given to the chromophore, the nature of the protein, localization within the plant, aspects of molecular biology, the physiology of action and the relationship of phytochrome with membranes. In part 3 cryptochrome and UV-receptors are covered. In this section the diversity of living organisms that are affected received attention. Adequate attention is also given to the chemical nature of the photoreceptors and to mechanisms of action. Part 4 covers the light environment. Aspects which are emphasized in this section are perception of light quality and quantity, light direction and polarization, photoperiodism and the role of light within the plant. In the fifth part some selected topics are dealt with. Photomodulation of growth, phototropism, photobiology of stomatal movements, photomovement, photocontrol of seed germination and of flavonoid biosynthesis all received some attention. The final part covers the photobiology of fungi, a genetic approach to photomorphogenesis and the coaction between pigment systems.

All chapters cover the advances made by 'simple' experimentation but stress the modern techniques of genetics and molecular biology which have contributed to our knowledge and which certainly will advance the field considerably in the next few years. The literature citations at the end of each chapter are adequate and an extensive index greatly assists the reader when interested in specific aspects.

The book is well presented and should be on the shelves of all science libraries.

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Inorganic Nitrogen Metabolism

Edited by W.R. Ullrich, P.J. Aparicio, P.J. Syrett and F. Castillo

Springer-Verlag, Berlin, Heidelberg, 1987
Price: DM148,00

This 188-page book presents the proceedings of an international symposium on inorganic nitrogen metabolism held at the Universidad de Extremadura, Jarandilla, Spain, during June 1987. The symposium was organized by the Federation of European Societies of Plant Physiology and intended as a successor to the well-known Long Ashton series of symposia on plant nitrogen metabolism.

The book is divided into four parts and covers the metabolism of inorganic nitrogen in both prokaryotes and eukaryotes. Part 1 is a short section dealing with energetics and carbon assimilation; it does seem somewhat out of context in a meeting devoted to nitrogen metabolism and contains little material of direct relevance to the main theme of the seminar. Part 2 provides a six-paper general survey of the uptake and metabolism of inorganic nitrogen with separate sections devoted to prokaryotes (Cyanobacteria and heterotrophic bacteria), eukaryotic algae and higher plants. It includes an informative ecophysiological comparison of nitrogen assimilation in various plant groups, an interesting survey of nitrate and ammonium uptake in green algae and higher plants, and a review of nitrogen assimilation in algae. Part 3 incorporates 32

papers on the enzymes of nitrogen metabolism. Nitrate and nitrate reductase are the subjects of 11 of these papers, many of which are concerned with the regulation of the activity of the enzymes. Modern analytical approaches including immunochemical and immunosorbent (ELISA) assays with monoclonal antibodies are described in some of the papers, and an interesting contribution on the genetic control of nitrate reductase in Chlamydomonas, using genetic analysis of mutant strains, indicates the complexity of the control mechanisms involved in enzyme activity regulation. Six papers are devoted to the enzymes of ammonium metabolism in a variety of bacteria, algae and higher plants. Included among these is an informative contribution on the use of plant mutants in the elucidation of the roles of the glutamine synthetase isozymes in ammonium processing, particularly during photorespiration. Nitroganese activity is the theme of some 8 papers, including topics such as the genetics of the hydrogen uptake system of *Rhizobium*, ATP and nitrogen fixation, and the potential applications of *Azospirillum* inoculation of cereal plants in agriculture.

Part 4 focuses on the regulation of nitrogen utilization in plants and includes a wide range of papers on different topics associated with this process. The regulation of nitrogen assimilation by NADH and nitrate availability rather than the amount of nitrate reductase present in a plant is an interesting hypothesis put forward in one paper. Other informative contributions deal with the modulation of nitrogen uptake and assimilation in plants by potassium; the differential distribution of carbon in plant parts brought about by nitrate and ammonium nutrition; and the effect of the form and concentration of nitrogen feeding on CO_2 gas exchange in C_4 grasses.

This book is obviously intended for the advanced student or research worker in plant nitrogen physiology. It provides a valuable review of all aspects of current research in plant nitrogen metabolism and furnishes details of the latest techniques involved in this research. A comprehensive reference section is included at the end of the book. The quality of the work with its numerous tables and illustrations is of the high standard normally associated with this publisher and the clarity and organization of the information presented does credit to the editors. The book is of particular interest to South African readers in that work of the plant nitrogen research schools at Cape Town and Witwatersrand Universities is featured in its contents.

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Grasses, Sedges, Restiads and Rushes of the Natal Drakensberg

O.M. Hilliard
Illustrated by L.S. Davis
Ukhahlamba Series, Number 2
University of Natal Press, Pietermaritzburg, 1987
viii + 69 pp., colour frontispiece + 3 colour plates, 90 line drawings
Price: R7,95 + G.S.T.
ISBN 0869804766 (Series)
ISBN 0869805355 (no 2)

Visitors to South Africa's Drakensberg Mountains are fortunate to have available a second booklet on the natural history to enhance their holidays and memories of the area. This publication is small and compact and includes all essential information, e.g. glossary and measurement scale, for use in the field. It is attractively presented to appeal to a wide cross-section of the public.

The keys to the families, which are accompanied by explicit drawings, engender a feeling of confidence for amateurs to attempt to identify grasses, sedges and restiads. Further keys for each of the groups are clear, concise and well conceived.

There is a good balance between text and illustrations. These are finely executed and complement the text which of necessity has been reduced to a minimum. The detailed, magnified floral structures in many of the species illustrated, may elicit frustration from users of the handbook, as a microscope rather than a pocket 10 hand lens is needed to corroborate the visual evidence.

The genera with few species occurring in the Berg present little difficulty. Those with ten or more species may result in incorrect identification unless the majority mentioned are collected so that comparisons, using the text, can be made.

For a specialist to cater for amateurs is a difficult task that has been most ably accomplished in this booklet. Naturalists and travellers to the Drakensberg have available an excellent field guide both for enjoyment and educational purposes.

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South African Journal of Botany

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Review articles: Review articles will be accepted if the reviewer summarizes and critically evaluates the data of other workers and (a) comes to new conclusions regarding the problems investigated or (b) indicates a gap in our knowledge, which requires additional research. Contributors are advised to send the Scientific Editor an outline before writing a review paper.

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Procedures or Methods: These should be described briefly but in sufficient detail to allow repetition of the work. It is frequently important to mention the source of materials used, especially of living organisms. Accepted nomenclature and abbreviations may be used for standard methods, chemical compounds, hormones, enzymes, etc. A reference is sufficient for a previously described method unless the principle involved is not self-evident, in which case it should be indicated.

Results: The main results should be stated in the text, with references to any tables, diagrams or illustrations where the supporting evidence is to be found. The same applies to any special features or incidental results considered to be of interest. It is not necessary to describe the contents of tables in the text.

Discussion or Conclusions: These headings are sometimes not needed. The second is appropriate when the conclusions from the work can be conveyed in a few sentences. Under the first heading, the principal results should be critically discussed in logical order and the conclusions from them should be stated; results that suggest new lines of study should be pointed out; attention may be drawn to the implications of the results and to agreements or disagreements with previous work. The Discussion should not consist merely of a repetition in a different order of the contents of preceding sections.

Acknowledgements: Acknowledgements should be kept to the minimum compatible with the requirements of courtesy.

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CODD, L.E. 1975. *Plectranthus* (Labiatae) and allied genera in southern Africa. *Bothalia* 11: 371–442.

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